State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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November 10, 1993

Mr. Steve Lackey
Environmental Coordinator
Barney's Canyon Gold Mine
P.O. Box 9600
Bingham Canyon, Utah 84006-0311

Re: Approval of Proposal for the Land Application of Biosolids to Test Area at the Barney's Canyon Mine, Kennecott Corporation, M/035/009, Salt Lake County, Utah

Dear Mr. Lackey:

The Division has reviewed Kennecott's proposal, received October 29, 1993, for the application of biosolids to test areas at the Barney's Canyon mine site. This proposal is considered to be an amendment to Kennecott's test plot proposal submitted to the Division on August 4, 1993, entitled, "Recommendations for the Direct Establishment of Vegetation on Trial Areas of Waste Rock, High Wall and Road-cut Slopes in the Vicinity of Barney's Canyon Mine and Barney's Canyon South and Melco Pit, Respectively". The original proposal was approved, by the Division on September 8, 1993.

The original proposal has been amended to include a more extensive use of biosolids, as part of the test plot program. This test plot program has been developed to determine the potential for obtaining a successful plant community, by applying selected plant species, biosolids, and other amendments, to a series of waste rock test plots.

The Division hereby approves your proposal with the following conditions:

1. Please provide as-built information to the Division describing the final disposition and design of the test plots to be placed on the Barney's Pit test plot area and the 6400/6500 dump test plot area. Such specifications would include: number of test plots, dimensions, applications specific to

each plot (seed mixtures employed, slope, topsoil depth, fertilizer application rate, sludge application rate, aspect, etc.).

2. Please provide soils analysis information to the Division, which characterizes: 1. the waste material; 2. the topsoil material to be used; and 3. the biosolids to be received from the PTOW. **Please see analyses suggestions below.**

3. The Division will require that the operator provide a description regarding the implementation of Barney's Storm Water Pollution Prevention Plan, as it relates to this particular site. For example, will silt fencing be installed down slope from the test plots to catch eroded material, or will some other means of capturing erodible sediments be provided?

4. If the schedule of activities for reclamation trials, established on Table 3 of the original proposal, has changed, provide the Division with a time table for implementation of the test plots, monitoring and project completion. Also, provide information addressing the variables which will be monitored at each test plot (plant species and cover values, soil characteristics, site stability, etc.). Monitoring methodology needs to be described in the test plot plan summary.

The Division suggests that Kennecott analyze the waste, soils and sludge materials for the following constituents:

1. pH
2. SAR
3. EC
4. nitrate-N
5. Water Holding Capacity
6. CEC
7. acid-base analysis (for wastes only)
8. Organic Matter Content
9. Texture (Sand, Silt, Gravel)
10. Phosphorus
11. Potassium
12. DTPA extractable metals (Fe, Zn, Cu, Mn, Cd, Pb, Ni, Cr)
13. Saturation extractable (Ca, Na and Mg)
14. Carbon to Nitrogen ratios (C:N) (for soils and sludge only)

* *Possible additions or reductions to the parameter list will be subject to the outcome of the preliminary analytical results/information generated.*

The same constituents should be evaluated on an annual basis, for the amended soils, in each test plot or each treatment plot (one composite sample for each treatment plot). The duration of the test plot evaluation will be established by Kennecott.

The Division also suggests that the operator include some shrub species in the proposed seedmix for these test plots. The species to be used, listed in Table 2, do not include any shrub species. Because the zone you are attempting to revegetate is found within the Mountain Shrub Plant Community, successful shrub establishment should be one of the ultimate goals/objectives sought.

These suggestions are made, because this project will be used as a means of evaluating the benefits or disadvantages of sludge application to a nutrient deficient mine waste/soil. The Division encourages using a structured scientific approach on this and other similar test plot programs. The information generated from these plots will be extremely useful in determining what type of basic information will be needed for future, larger scale, sludge application projects.

Permitting of the Biosolids Program is a joint effort between the Division of Water Quality (DWQ) and this Division. We understand that DWQ has issued an approval that requires you to submit data, similar to our request. If you wish, you are welcome to prepare one individual submittal that will address the questions established by both agencies.

The Division appreciates Kennecott's initiative in taking steps to initiate one of the first Biosolids Programs, in Utah. If you have further questions regarding this letter please contact me or Holland Shepherd of my staff.

Sincerely,

D. Wayne Hedberg
Permit Supervisor
Minerals Regulatory Program

jb
cc: Don Ostler, DWQ
James Carter, DOGM
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